[0035] FIG. **8** is a set of graphs representing aberration curves of the optical imaging system illustrated in the embodiment of FIG. **7**.

[0036] FIG. **9** is a table representing characteristics of lenses of the optical imaging system illustrated in the embodiment of FIG. **7**.

[0037] Throughout the drawings and the detailed description, the same reference numerals refer to the same elements. The drawings may not be to scale, and the relative size, proportions, and depiction of elements in the drawings may be exaggerated for clarity, illustration, and convenience.

DETAILED DESCRIPTION

[0038] The following detailed description is provided to assist the reader in gaining a comprehensive understanding of the methods, apparatuses, and/or systems described herein. However, various changes, modifications, and equivalents of the methods, apparatuses, and/or systems described herein will be apparent to one of ordinary skill in the art. The sequences of operations described herein are merely examples, and are not limited to those set forth herein, but may be changed as will be apparent to one of ordinary skill in the art, with the exception of operations necessarily occurring in a certain order. Also, descriptions of functions and constructions that are well known to one of ordinary skill in the art may be omitted for increased clarity and conciseness.

[0039] The features described herein may be embodied in different forms, and are not to be construed as being limited to the examples described herein. Rather, the examples described herein have been provided so that this disclosure will be thorough and complete, and will convey the full scope of the disclosure to one of ordinary skill in the art.

[0040] Throughout the specification, it is to be understood that when an element, such as a layer, region or wafer, such as a substrate, is referred to as being "on," "connected to," or "coupled to" another element, the element is possibly directly "on," "connected to," or "coupled to" the other element or other elements intervening between the element and the other element are optionally present. In contrast, when an element is referred to as being "directly on," "directly connected to," or "directly coupled to" another element, there are no elements or layers intervening between the element and the other element. Like numerals are used to refer to like elements throughout. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0041] It is to be apparent that though the terms first, second, third, and so on, are used herein to describe various members, components, regions, layers and/or sections, these members, components, regions, layers and/or sections are not to be limited by these terms. These terms are only used to distinguish one member, component, region, layer or section from another region, layer or section. Thus, a first member, component, region, layer or section discussed below could also be referred to as a second member, component, region, layer or section without departing from the embodiments.

[0042] Spatially relative terms, such as "above," "upper," "below," and "lower," and so on, are used herein for ease of description to describe one element's relationship to another element(s) as shown in the figures. It is to be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as "above," or "upper" other elements would then be oriented "below," or "lower" the other elements or features, accordingly. Thus, the term "above" encompasses both the above and below orientations depending on a particular direction or viewpoint of the figures. The device may be otherwise oriented, such as being rotated 90 degrees or at other, arbitrary orientations, and the spatially relative descriptors used herein may be interpreted accordingly.

[0043] The terminology used herein is for describing particular embodiments only and is not intended to be limiting. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It is to be further understood that the terms "comprises," and/or "comprising" when used in this specification, specify the presence of stated features, integers, steps, operations, members, elements, and/or groups thereof, but these terms do not preclude the presence or addition of one or more other features, integers, steps, operations, members, elements, and/or groups thereof.

[0044] Hereinafter, embodiments are described with reference to schematic views illustrating the embodiments. However, in the drawings, for example, due to manufacturing techniques and/or tolerances, small modifications of the shape shown are possible. Thus, embodiments are not to be construed as being limited to the particular shapes of regions shown herein, for example, to include a change in shape resulting from manufacturing. The embodiments also may include features based on one or a combination of features presented in the embodiments discussed as examples.

[0045] The contents of the embodiments described below possibly have a variety of configurations and propose only a required configuration, but configurations are not limited to the described configurations and may include other features without departing from the embodiments presented.

[0046] An aspect of the present embodiments provides an optical imaging system having a long focal length.

[0047] In addition, in the present description, a first lens refers to a lens closest to an object or a subject to be photographed, while a fifth lens refers to a lens closest to an imaging plane or a corresponding image sensor. In addition, all of the radii of curvature and thicknesses of lenses, a through-the lens (TTL) aspect, an ImgH such as ½ of a diagonal length of the imaging plane, and focal lengths are represented by millimeters (mm). Further, thicknesses of the lenses, gaps between the lenses, and the TTL are distances in optical axes of the lenses. Certain of these metrics are discussed and defined further, below. Further, in a description for shapes of the lenses, the meaning referred to that one surface of a lens is convex is that an optical axis portion of a corresponding surface is convex, and the meaning referred to that one surface of a lens is concave is that an optical axis portion of a corresponding surface is concave. Therefore, although it is described that one surface of a lens is convex, an edge portion of the lens is possibly concave. Likewise, although it is described that one surface of a lens is concave, an edge portion of the lens is possibly convex.

[0048] In an embodiment, an optical imaging system includes an optical system including a plurality of lenses. For example, the optical system of the optical imaging system includes five lenses each having a refractive power.